Customer Value Management

Using a Data Warehouse to Determine Customer Profitability, Customer Tenure and Lifetime Value — Mobile Market

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Introduction

The mobile market is undergoing a major transition. In many countries, penetration rates are beginning to peak, and therefore, the operators are moving from a strategy of new customer acquisition to one of retention and increasing customer spending and profitability.

Several operators are seeing their stock prices fall due to analysts' reports that the number of new subscribers is declining. The move towards measuring an operator's performance based on average revenue per user (ARPU) is a step in the right direction. ARPU only represents revenues. It can portray a false economy if an operator needs to increase marketing and systems spend by €30 per user to see an increase in ARPU of €15.

In most mobile operators, customer value is determined by revenue. However, this does not consider the true cost of providing service to the subscriber. The major drivers of costs such as call behaviour and customer care usage are not taken into account. The obvious flaw in using revenue to determine customer value is the cost of providing service is not necessarily proportional to revenue. Using revenue to make decisions about retention and acquisition can result in poor decisions being made. This can drive up cost and reduce margins.

The market is now at a mature stage of development whereby the true measurement of a company's performance should be average margin per user (AMPU). By having the complete view of revenue and costs, operators will be in a much stronger position to develop marketing, pricing, network roll out, and IT strategies. Strategic and tactical decisions can be made with the underlying ethos of profitability driving the business.

Using profitability as the key metric when determining the value of customers involves being able to calculate the actual margin for individual users, corporate customers, across product offerings, and by many different market segments. Only when an operator has this information will they be able to roll out new, targeted marketing and CRM campaigns. This would seem the best foundation when deciding on which targets should get subsidised GPRS and 3G handsets. Using existing information to maximise return on investment (ROI) by implementing value-based marketing plans would seem the optimal way to go. Having customer profitability measurements involves using customer value measurement as the basis for driving behaviour.

Many mobile operators already have the data in their systems. This data can be used to implement a move to measuring customer profitability and thus reporting company performance not on new subscriber additions, not on average revenue per user, but moving to a more meaningful metric of measuring customer profitability. As stated, the data, in many cases, already exists. It is a matter of knowing where to look for it, what to look for, and using data warehousing and reporting methodologies to present the information. This can have a dramatic effect on marketing, CRM, partner management, network building, roll out, and enhancement as strategic and tactical budgetary spending decisions are made with the solid foundation of profitability measurement which can optimise ROI on operational spending.

Customer Value Measurement

A key performance indicator of many companies is customer Lifetime Value (LTV). However, many mobile customers are not tied into a time sensitive fixed-term contract (e.g., pre-paid), and the length of current contract is not a practical guide to the lifetime tenure of a post-paid customer. Some advanced operators have adopted a statistical analysis technique called Survival Analysis to provide Customer Lifetime / Tenure forecasts to determine the expected lifetime of customers. This involves analysing behaviour to determine the expected lifetime of a customer. Since this is based on customer behaviour and not contracts then it is equally applicable for both pre- and post-paid customers.

The combination of customer tenure based on customer lifetime analysis and customer profitability measurement gives a view of customer LTV based on profitability and behaviour.

Sample Financial Impact of Customer Profitability Measurement

The rationale associated with creating a customer profitability measurement solution for a customer is based on developing cost and spend allocation plans that are built on the premise of maximising ROI. The following marketing and CRM example uses industry figures to highlight the financial benefits that can be gained.

[illegible] Retention and Acquisition

The pressure from the market to acquire new customers could be reduced. Churn, decreasing ARPU, and increasing cost of acquiring new subscribers (Cost Per Gross Addition — CPGA) are forcing operators to chase new, often non-profitable customers, sometimes at the expense of spending money retaining their most profitable customers. If we take an example from the U.S. long distance market, we can see the results of consistent pressure to measure performance of new subscribers. The U.S. long distance industry boasts revenues of around $110B from approximately 230 million accounts with an ARPU of just over $40 per month. The long distance CPGA averages between $250 and $400. Assuming a low-end churn rate of 25%, more than $27B of industry revenue shifted among carriers in the last year. For a major carrier with a 38% market share, churn costs them around $10B in lost revenue. That's the equivalent of 21 million average revenue subscribers (accounts). At a $250 CPGA, it will cost that carrier more than $5B to replace those accounts. That's $15B, or more than 41% of their gross long distance revenue.

By adopting a performance and measurement metric of customer profitability, operators can see where to allocate their marketing, CRM, and customer retention spending. This can have significant implications on the financial performance of an operator. Going back to the U.S. long distance market example, if we assume a high-end retention cost of $100 per account, this carrier would have saved more than $13B in lost revenue and acquisition costs avoided with the right retention efforts by knowing which customers they did not want to lose. This may never be 100% achievable, but even if only 10% of this is achievable, it represents a $1.3B in savings. Relating this figure to stock market performance, assuming a total of 3.5 billion shares outstanding, this $1.3B equates to 37 gross cents per share. Assuming a 40% bottom line impact (gross less taxes and other expenses) this would yield 17 cents per share or more than four cents per quarter.

One more point on the U.S. long distance market example. With a $20 per month profit, at best it will take 12.5 months just to recoup the acquisition cost. Based on this and a variety of other factors, most industry estimates indicate two to four years to attain account profitability. Unfortunately as market pressure increases and operators scramble for new subscribers, there is a good chance that many of those new accounts will not be around after two years.

Although the above example covers the U.S. long distance market, there are many parallels that can be drawn on the European mobile market. For example, who's going to pay for the handset when migrating an existing second-generation GSM customer to third generation? Subsidising handsets for everyone may not be cost effective. Pro-actively subsidising handsets to the most profitable customers could, on the other hand, be a worthwhile investment.

Customer Value Measurement

Marketing and CRM are only two areas that can benefit. Others can include network optimization, whereas the implementation of this solution will provide significant customer value, in that it enables customer profitability to be taken into account when deciding on network build and roll out. Operators can manage and prioritize network infrastructure investments based on high-value customer locations.

Solution Concept

The proposed solution would be based on the following concept. Customer behaviour event data from a data warehouse is used to allocate major cost categories based on customer behaviour patterns. For example, one major expense category is network expense. This would be allocated based on call behaviour. This can include voice calls, messaging, data calls and IP-based browsing, content purchasing, and exposure to advertising on mobile portals on 3G services. An example of call type profitability measurement could be SMS users sending a high volume of messages between 3pm and 4pm. This could be children getting home from school. SMS is relatively inexpensive (about 10c per message), but it is also highly profitable for the operators.

In addition to this, call types must be analysed for profitability by customer.

Sample call types include:

- Mobile to mobile (on net and off net)
- Fixed to mobile
- Mobile to fixed (local, long distance, international)
- Messaging — SMS (short message service), MMS (multi-media messaging service)

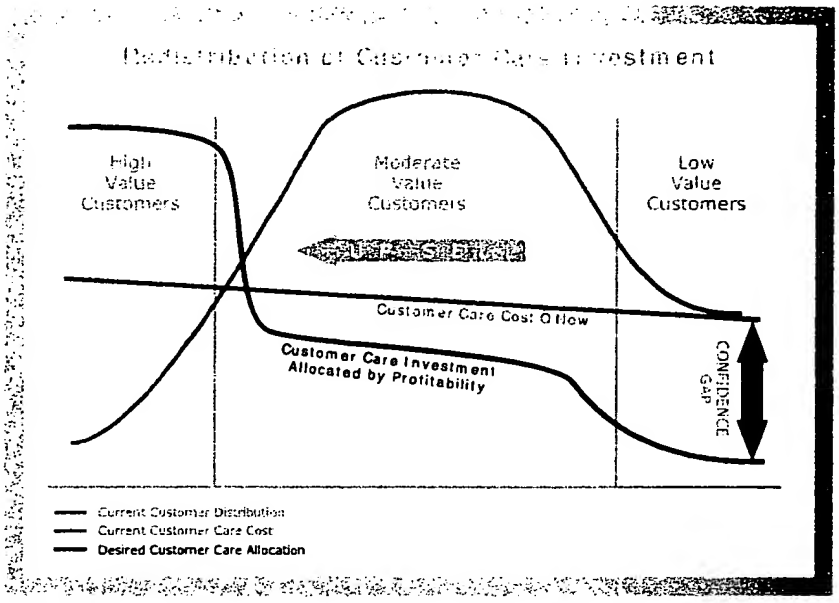

Figure 1: Customer Care Investment

- Data — mobile to fixed
- Data — mobile to mobile
- Content — browsing
- Content — with purchase (value variables will apply)
- Content — access to 'sponsored' advertising
- Roaming (all variables as above)

Variables that can affect the costing of a call include:

- Network usage — optimal capacity
- Time of day
- Roaming network
- Routing of calls
- Interconnect pricing agreements (for transit and off net terminated calls)
- QoS, Latency, and SLA for IP calls
- Call discounts based on promotions (e.g., friends and family type discounts)

Customer Types can include:

- Pre-paid: by numerous market segments
- Post-paid: contract type and package subscribed to, also by numerous market segments

The above list is not exhaustive. It intends to give only a sample. Different operators will have their own definitions, terminology, and ability to capture and analyse different costs. When implementing a customer profitability measurement solution, a key point to remember is operators will vary and there is no 'one-size-fits-all' approach.

Customer Value Measurement

Sample Use of Customer Profitability Information – Maximising ROI from CRM

While operators look to offer less expensive methods of CRM than dealing with a customer service representative (CSR) for low profitability customers, in reality this is not happening on a global basis. Figure 1 indicates that CRM spend per customer is roughly the same for ALL customers.

Low profitability customers should be directed to integrated voice response (IVR), computer telephony interaction (CTI), and web-based CRM solutions. With the advent of 3G and content services, the types and levels of questions a CSR may face will increase. This may result in an operator making additional human and training investment in CSR resources. Such resources must be used in a profit-oriented, optimum fashion.

How to Get There

How an operator reaches the point where they can have the processes and solutions in place to be able to measure customer profitability will depend on where they start. There are certain basic processes that must be in place to embark on the road to using profitability as the main measurement metric on which to develop and implement operational plans. This roadmap will be different for operators depending on their circumstances.

Figure 2 illustrates a sample roadmap for an operator's implementation of a customer profitability measurement solution, whereby different revenues and costs can be captured and measured over planned time periods. As can be seen from Figure 2, the goal is to be calculating customer lifetime value, using profitability and not just revenues. However, to measure lifetime value, there must be two basic metrics — customer value and customer lifetime. We will discuss how to measure customer lifetime in a later section of this paper.

One of the crucial points is that it is up to the operators to define profitability. Different operators will have different measurements and definitions of profitability.

Solution for Customer Profitability Analysis

Revenue data and cost data exist in your business support and financial systems. It is a question of collecting this data in a data warehouse and turning the combination of data into actionable information. However, many operators have individual data marts for each business support system (BSS) 'source system' (e.g., a separate data mart for retail billing, a separate data mart for customer care, and so on). Several leading operators are now adopting data mart consolidation (DMC) as they look to gain an enterprise view of their customers. DMC has also been proven to reduce total operational and data management cost.

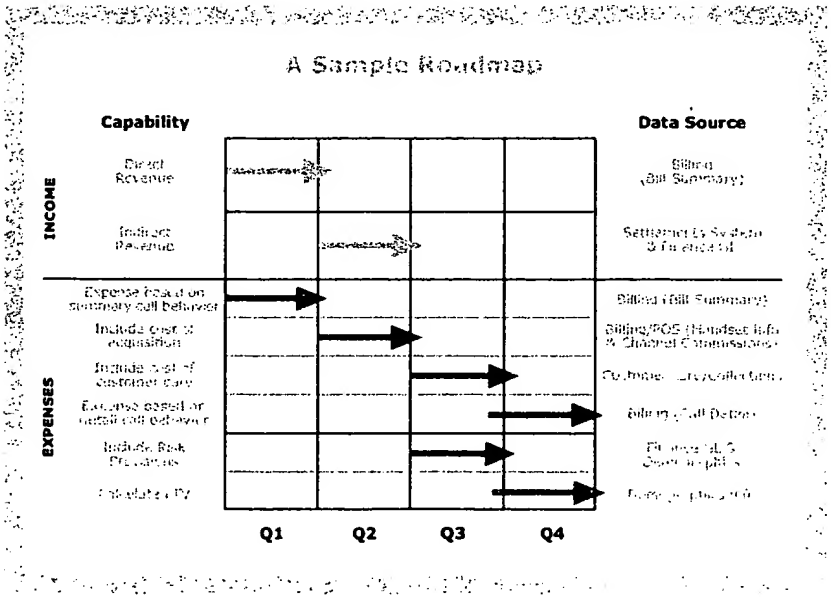

Figure 2: A Sample Roadmap

Customer Value Measurement

The enterprise data warehouse collects data from numerous different systems to build up a picture of all relevant customer revenues and costs. The data is transformed into information by the data warehouse and can be accessed by the relevant departments and management and transformed into strategic and tactical actions.

Figure 3 represents the proposed solution architecture.

Determining Customer Profitability

Revenues

Retail Bill

The immediate assumption is to look at the retail billing system. The higher the retail bill, the more revenue a customer is generating. However, there are other elements to consider.

Interconnect for Incoming Mobile Calls

How much interconnect revenue is a customer responsible for? If a mobile user only rarely makes calls, we must not overlook the fact that calls to the user's mobile phone may be generating interconnect revenue for calls made from fixed line phones. For example, a user offering an "out of office" business service (e.g., plumbers or electricians). By the nature of their professions these people are 'on the road' all the time. Their mobile phone is their office phone, and for all fixed to mobile calls, the mobile operator will receive a percentage of the retail call value in interconnect settlement.

Other Third-Party Settlements

Other third-party settlements could include content purchases, which are made with an electronic purse or a credit card. Under a content value chain agreement, the mobile operator may be entitled to a percentage of the value of the content transaction in return for hosting the content on their mobile portal. These transactions could involve low-value content (e.g., browsing local weather) or high-value transactions (e.g., buying a last minute plane ticket en route to the airport). For high-value transactions it may not be prudent to put them on the retail bill at the month end, so the transaction data will not appear on the bill. Likewise an operator could host advertising on their mobile portals. An advertiser may pay the operator a fixed fee per month and/or a percentage of all subsequent purchases and visits to the advertiser's home site via the operator's mobile portal. Again, this information will not appear on the retail bill, but needs to be taken into account when determining the revenue element of the profitability equation for each customer.

Expenses

Overview

This section provides an overview of the expense categories that will be used. It also provides a recommended approach for allocating expenses on a per-event basis.

At a high level it can be seen that calls made during the peak busy hour would be assigned a heavy share of network costs, whereas calls that are made during off-peak periods would be assigned a lighter share of costs. As shown in Figure 4, the other cost categories that are allocated by behaviour include, Call Centre operations, billing, collections, and customer acquisition costs, which would include channel commissions and subsidised equipment.

Cost data is aggregated to the customer level and stored in the data warehouse. Profitability data can then be used to segment customers. This would allow

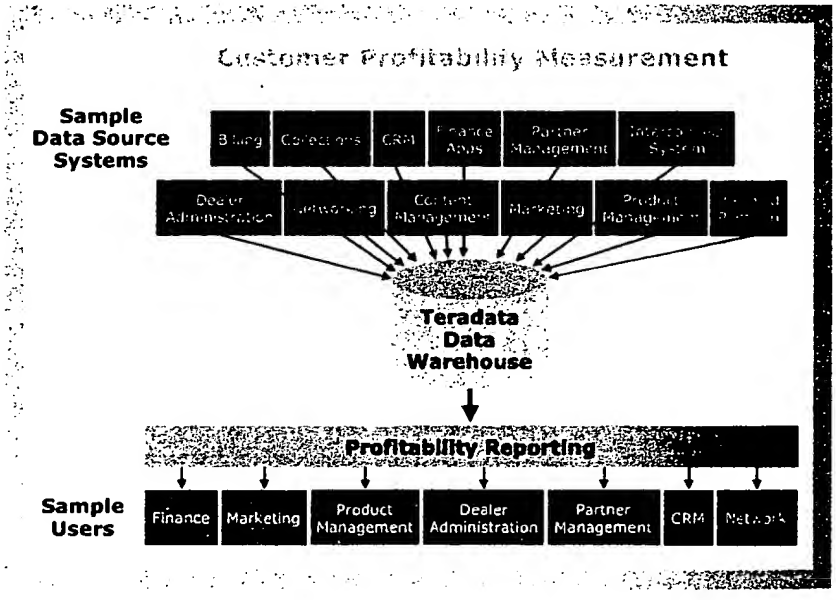

Figure 3: Solution Architecture Overview

marketing to focus retention campaigns on highly profitable customers. Acquisition campaigns would be focused on the profile of customers who are most profitable. The net result would be a shift to a mix of customers that yield greater margins at the same level of cost.

Expenses can be analysed further, and will include the following categories:

Overhead Expense

Overhead expenses will consist of all expenses not specifically broken out in the remainder of this section. In general, overhead is considered to be fixed expenses that will not increase as a function of the number of subscribers, the number of calls handled, etc. There may be, in fact, some expenses that do increase as a function of the number of subscribers and the number of calls that are lumped into this category. This is done to make the expense allocation model simpler. For the purpose of this paper we are considering the effect of this allocation rule to be minor in the overall scheme of things. Overhead expenses will be allocated evenly to all active subscribers.

Network Expense

Overview

Network cost represents one of the most significant categories of expense for a mobile operator. The network is engineered to handle peak call volumes. If peak call volumes are increased the network must be expanded in order to prevent call blocking during the peak period. For purposes of allocating network costs, we have divided the cost into three different categories: Mobile Network and Interconnect Transport expense.

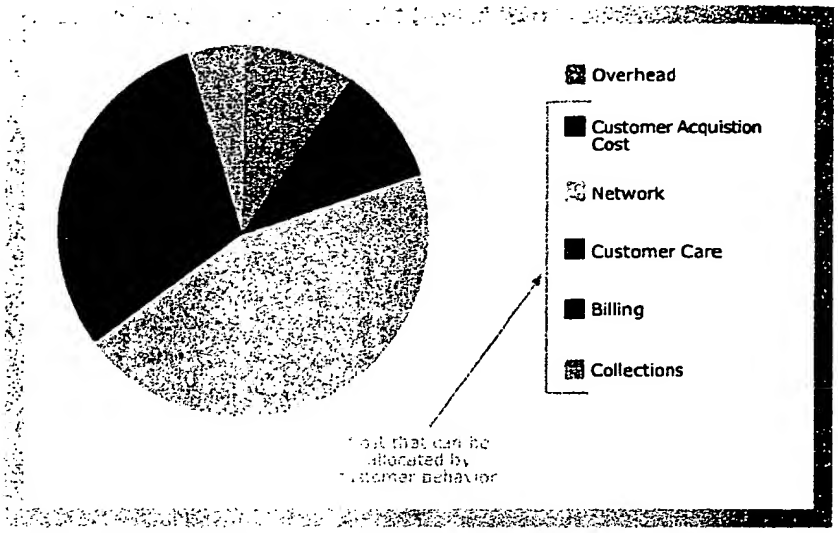

Figure 4: Costs that can be Allocated Based on Customer Behavior

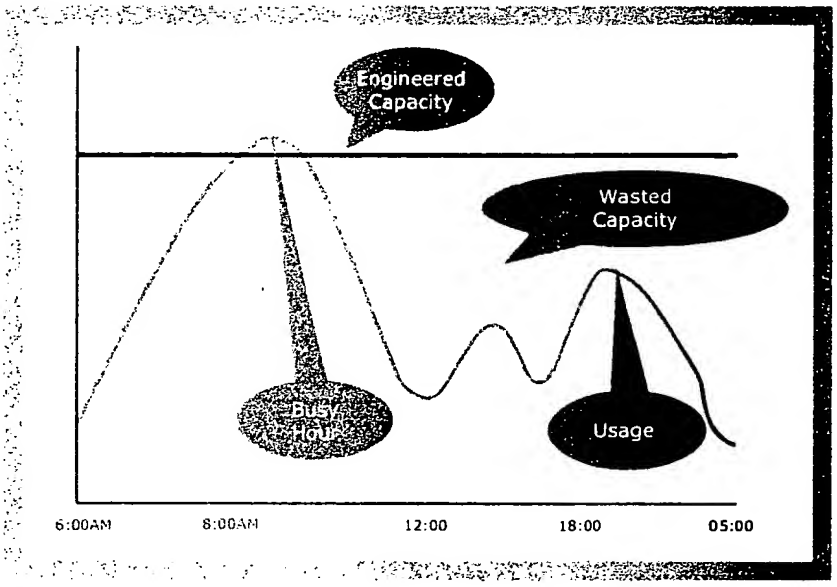

Figure 5: Mobile Network Utilisation

As can be seen from Figure 5, a mobile operator may have a large amount of dormant capacity dependent of usage by time of day.

Once customer behaviour is understood, you would like to acquire more customers with a similar behaviour through targeted marketing campaigns and price-plans

designed to attract the right kind of customers and to stimulate the right kind of calling behaviour. Figure 6 illustrates how this can be done.

Mobile Network Expense

This expense category includes the vast majority of network costs. This includes switches, cell sites, and leased lines that connect cell sites to the switch. This also includes central office expense, right-of-ways and land associated with the network, and any other miscellaneous network expenses. When doing new network build out and planning additional capacity, operators can prioritise roll out based on the geographic usage patterns of their most profitable customers. For example, if an operator finds that the majority of their high profit traffic is generated from a specific geographic location (down to cell site ID) then, build out should be concentrated in those areas. This will optimise usage based on return over network enhancement expense.

Interconnect Transport Expense

This expense category includes the cost of transit and terminating portions of a call that traverse or terminate on a third party's network. Optimised routing of calls can be based on customer profitability, routing cost, and interconnect partner agreement. For example, transit calls are cheaper from Ireland to Germany if the call is routed via Operator A as opposed to operator B. With the introduction of voice and data over IP, operators must ensure that customer profitability is not penalised by interconnect charges being greater than the retail bills for certain types of calls. This could happen if the mobile operator has introduced service level agreements (SLAs) with some customer groups. As a result of these SLAs, pricing can be carried out based on, among other variables, quality of service (QoS) of the call. If these SLAs are not enforced on interconnect partners at a wholesale level, the operators may have to discount a call because of a poor QoS. However, they may still face the full wholesale bill from their interconnect partner. This would show the retail customer as non-profitable, which is not the case and could lead to poor decisions being made.

In the case of roaming calls, operators must account for different roaming agreements and the interconnect portions of roaming calls when determining the profitability of the calls made.

Billing Expense

Overview

Billing costs represent the second biggest cost category behind network costs. Billing costs have been divided into two basic categories: call record processing and invoice processing. The rationale behind this breakdown is to reflect the high cost of capturing, guiding, rating, and posting calls to a customer invoice. The CDR process in billing occurs for each call made, whereas invoice processing need be done only once per month.

Billing Call Record Process Expense

This expense category includes the cost of CDR recording, processing, and storage for both pre- and post-billing. Processing includes guiding, rating, and invoice posting. The rationale behind this cost category is to reflect the billing expense associated with invoicing calls. Thus a subscriber that makes a lot of short calls will carry a higher cost than a subscriber that uses the same number of minutes with fewer calls.

Billing Invoice Processing Expense

This expense category includes the processing needed to create a billing invoice. This includes bill calculation, invoice formatting, printing, mailing/handling, and payment processing. The rationale behind this

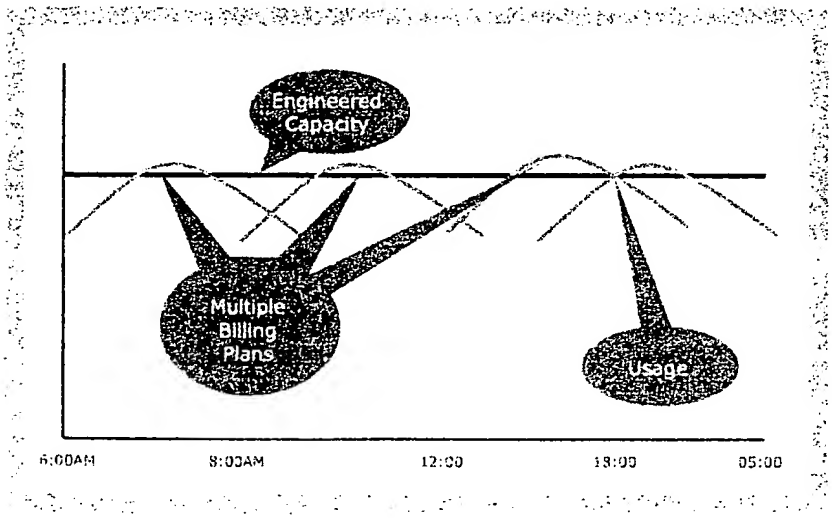

Figure 6: Using Price Plans to Stimulate Desired Mobile Network Utilisation

cost category is to reflect the expense of producing a billing invoice each month. A subscriber that has a very inexpensive plan and produces little revenue will have a high billing cost as a percent of revenue since this cost is fixed each month for each subscriber.

Customer Care Expense

This expense category includes all costs associated with handling an in-bound customer contact. This includes the cost of labour, facilities, and communications. The rationale behind this cost category is to reflect the expense of supporting subscribers that make an excessive number of calls to customer care to get credits, report problems, or to get general support.

Collections and Past Due Expense

This expense category includes all costs associated with collection of past due accounts. The rationale behind this cost category is to reflect the expense of carrying accounts receivables for those who pay late.

Sales & Marketing Expense

This is the expense to acquire and retain customers. The customer acquisition expense normally comes in the form of a commission that is paid to a sales channel. This customer profile should contain information about the channel that acquired the customer and the amount of the commission paid, as well as subsidies paid on handset upgrades.

Customer Lifetime and Lifetime Value

Survival Analysis — Providing the Tenure Element in Calculating Lifetime Value

Survival Analysis utilises statistical modelling based on customer behaviour that will help operators understand how long they can expect to keep a customer. As well as the factors that can affect longevity, survival analysis provides valuable insights into how operators can:

- Keep customers longer;
- Provide a better resource planning;
- Have a more profitable relationship with customers.

Survival analysis is designed to complement traditional churn modelling, and there are several ways survival models predicting length of time as a customer can be used by businesses. We will discuss these next.

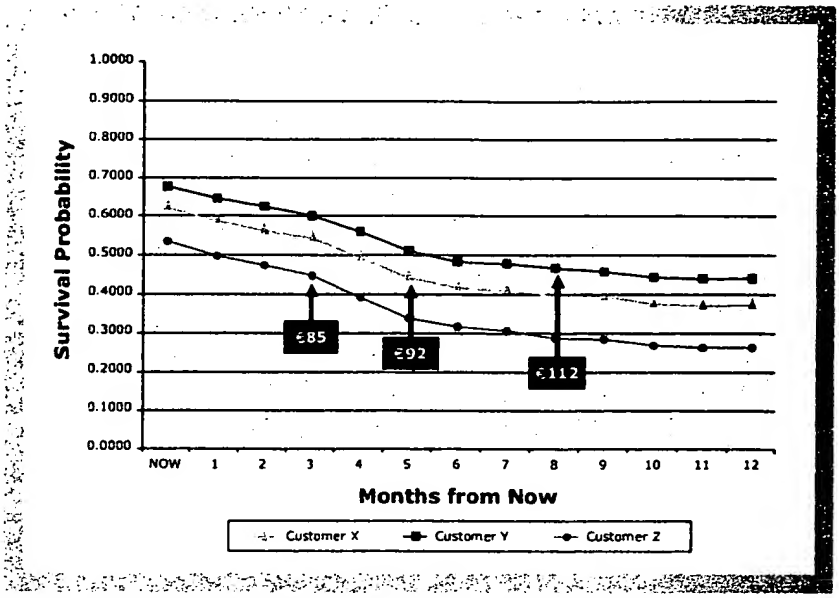

Figure 7: Survival Scores of Three Different Mobile Customers

Customer Planning and Management Applications.

A customer planning and management application has three parts to it:

1. Identifying timing of survival risk;
2. Profiling customers;
3. Performing "what if" analysis to help drive appropriate marketing actions.

Survival analysis enables the business to identify timing of "risky behaviour patterns" that lead to reduced survival probability in the future. The timing can be used as a way of staging marketing actions, as well as their expenditure. If a valuable customer is expected to churn next month, then aggressive action is warranted. If the company has six months, they can try less expensive alternatives first.

Figure 7 shows an example of three mobile prepay customers, with their monthly value to the company, as well as when they are likely to churn.

A mobile operator would typically spend as much as several hundred Euros to keep customers as valuable as these from churning. That is, however, if churn were imminent. In this case, the company has as much as eight months before one of these customers is at high risk. This allows the potential to try less expensive retention programs.

Customer Value Measurement

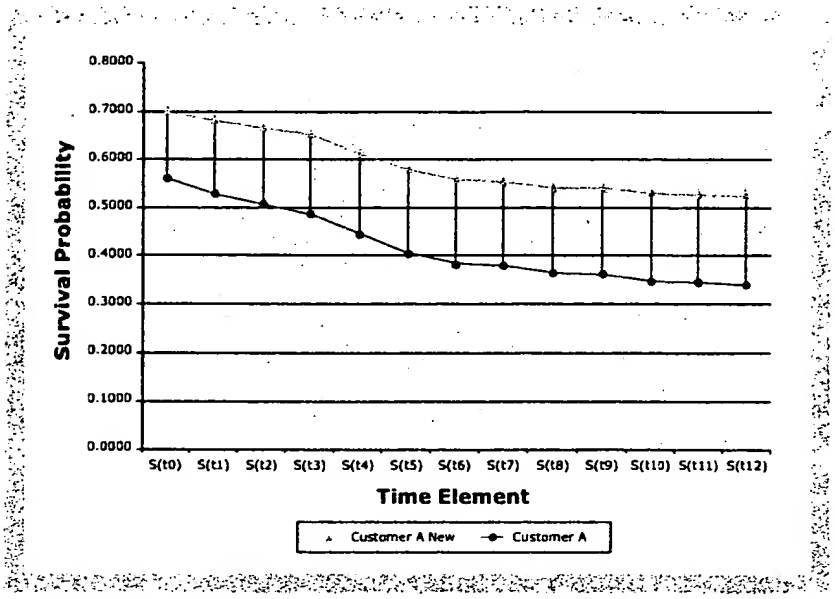

Figure 8: Survival Probability Change Based on Change in Customer Behaviour

Customers with different survival prospects can also be grouped together and profiled to see differences. Customers can be grouped based on their time as customer, similar demographics, or any other attributes of interest. These profiles can then show differences in calling patterns, topups, and network service problems.

Survival analysis applications can also be used to perform what if analysis to determine what the impact on survival probability over time would be from modifying a customer's, or group of customers, behaviour over time. This can be used to drive appropriate marketing actions, including call centre activities.

In Figure 8, we show the predicted impact on a customer's survival probability over the next year if the customer changes his behaviour from making low-value prepayments to making medium-value prepayments. This would increase his survival probability such that he would probably be retained as a customer. Exploring the impact of different factors on customers, or groups of customers, allows the marketer to plan marketing communications and offers so as to best maximise long-term customer retention.

Customer Survival Change Application

This application looks for changes in customers' survival scores, then uses important changes in scores to help drive appropriate marketing actions. The application works as follows.

1. Score customers monthly on the Survival model. Save score history.
2. Track scores over time.
3. If a customer's score decreases more than some, set threshold and the customer's value is greater than a set amount, then schedule a marketing action.
4. Marketing action is a call from the call centre where the application provides information about the factor(s) that caused the drop in score, as well as the urgency of timing in terms of survival probability.

Lifetime Value and Business Planning Framework

Another application of survival modelling is within the customer value management and business planning framework where survival modelling is combined with customer value to provide the basis for calculating customer lifetime value. This application enables a company to project expected profits, revenue, (or losses), or any other business metric, based on predicted survival rates of customer segments over time.

Customer value estimates are multiplied by predicted survival rates for the segments to derive forecasts that can be used for business planning purposes. This can also

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be extended to a customer lifetime value application, where value scores are derived from a statistical model. Monthly deseasonalised scores are multiplied by predicted survival rates for the segments to derive forecasts for lifetime value adjusted for survival probabilities.

Input to the application is a segment definition and the scores and projected survival probabilities of the customers within the segment. As in the customer planning and management application, segments can be groups of customers who are similar in terms of their time as customer, similar demographics, or any other attributes of interest.

For mobile operators, survival modelling is especially interesting for pre-pay customers, as well analysing the tenure for customers beyond a one-year contract term. Models can be built using detailed data representing such things as calling patterns, top-up behaviour (for pre-pay), abnormal call termination patterns, and customer service information. Customers can be scored based on the model. These scores can then be used to identify and analyse longevity problems with profitable customers. Over time, score histories can be saved to quickly spot those customers who have had a sudden shift in their predicted *lifespan*. Sensitivity analysis can be done using key factors known to influence customer survival. This helps the company make better use of resources and plan its marketing and customer service activities.

Summary

Developing a customer profitability measurement model can provide dividends to mobile operators. The mobile industry is still less than twenty years old, and as such is moving from a growth to a maturity stage. Like many other industries, different performance measurement metrics are used depending on the stage of evolution. The days when mobile operators are judged on the number of new subscribers are over. It is essential that this metric is not used as the driving force to determine the success of 3G, otherwise operators could find themselves being pressured to subsidise users, including the non-profitable users in order to provide market analysts with 'easy' figures. The market and the industry have evolved.

Developing average margin per user (AMPU) figures based on customer profitability measurement is the optimal way forward. It provides more accurate measures, and it can be used to show the market is now at a mature stage of development where the true measurement of a company's performance should be based on customer value. By having the complete view of revenue and costs, operators will be in a much stronger position to develop marketing, pricing, network roll out, and IT strategies. Strategic and tactical decisions can be made with the underlying ethos of profitability driving the business. However, many profitability measurements only provide the current picture of profitability.

In order to get an understanding of the expected lifetime value of a customer an operator must be able to forecast the expected tenure of a customer. Survival analysis provides a statistical modelling technique based on constant analysis of customer behaviour to provide the time element in calculating customer lifetime value. The current and historical profitability measures can be used to provide the 'value' element in this forecast.

Using profitability as the key metric when determining the value of customers involves being able to calculate the actual margin for individual users, corporate customers, across product offerings, and by many different market segments. Only when operators have this information will they be able to roll out new, targeted marketing and outbound CRM campaigns. This would seem the best foundation when deciding on which targets should get subsidised GPRS and 3G handsets. Using existing information to maximise ROI by implementing value-based marketing plans would seem the optimal way to go. Understanding customer profitability is more than about corporate reporting — it involves using customer value measurement as the basis for driving behaviour and profitability figures by individual customers, groups, segments, product lines, and so on. This is the key to unlocking customer value and ensuring that all strategic and tactical decisions are based on a strong financial foundation.